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SOME PUBLICATIONS ISSUED
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XXXIIÈME ANNÉE

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ROMA — STABILIMENTO TIPOGRAFICO F. FAILLI

The radio communiqués of the International Institute of Agriculture are transmitted between 11.50 and 12 (noon) on the following days: Monday, Italian; ***Tuesday,*** French; ***Wednesday,*** English; ***Thursday,*** German; ***Friday,*** Spanish.

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The hour of broadcasts is Central European Time, which is one hour ahead of Greenwich Mean Time and 5 hours ahead of Eastern Standard Time in the United States.

ACTIVITY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Permanent Committee of the Institute. — The second session of the Permanent Committee in 1943 will open on June 22 at 10 o'clock. The agenda includes several questions dealing with the administrative and scientific activities of the Institute. A summary of the works of this session will be given in the next chronicle.

Second meeting of the International Commission on the use of woods. — The International Commission on the use of woods of the International Forestry Center of Berlin (an organization created within the frame of the International Institute of Agriculture) met at Stresa from May 25 to 28 Prof. Martti Levon (Finland) President of the Commission, was in the chair.

The International Institute of Agriculture was represented at the meeting by its Secretary General, Prof. Ugo Papi. The Delegate of Spain at the Permanent Committee of the I.I.A. also attended the meeting.

The following countries were represented : Germany, Bulgaria, Spain, Finland, France, Hungary, Italy, the Netherlands, Slovakia and Switzerland.

The session was open by addresses of the President, Prof. Levon, of the representative of the Italian Government, Lt. General Felici of the National Forestry Militia, and of the representative of the German Reich, H.E. Alpers, State Secretary, President of the International Forestry Center.

Many statements were made by the different groups of experts and members of the staff of the C.I.S.

Very interesting visits to certain establishments of wood use gave the visitors the occasion to express their full satisfaction at the experiences they had witnessed and at the results that were obtained.

BOOKS PRESENTED TO THE LIBRARY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

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Crasemann, E. Gegenwartsprobleme der Tierernährung. [Bern], 1942. 30 p. (Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene. Eidg. Gesundheitsamt. Bern. Band XXXIII. Heft 3/4. 1942).

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Hesse, P. et Ko ne, E. Die Landwirtschaft im Wirtschaftsgebiet Niedersachsen. Oldenburg i.O., G. Stalling, 1942. (Provinzial-Institut für Landesplanung und niedersächsische Landes- und Volksforschung. Veröffentlichungen, Reihe A, I, Bd. 11. Schriften der Wirtschaftswissenschaftlichen Gesellschaft zum Studium Niedersachsens. Neue Folge.) v. 1. Textband. 1942. 688 p.

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Issoglio, G. Raccolta e conservazione dei prodotti ortofrutticoli. Torino, Società editrice internazionale, [1942]. VI, 252 p.

INTERNATIONAL BULLETIN
OF PLANT PROTECTION

1943 No. 6

PLANT PROTECTION AND PHYTOPATHOLOGICAL ORGANIZATION IN RUMANIA *

Introduction

Fourteen years have passed since, in Rome, through the initiative and under the auspices of the International Institute of Agriculture, the most authoritative representatives of twenty-four countries met together in this hall to lay the foundations of an international organization, uniting their efforts in order to control successfully the enemies of cultivated plants, to ensure rational protection with a view to better production, both qualitative and quantitative. The day of April 16, 1929 marked an epoch in the history of plant pathology and crop protection, as it was the first time that a convention was formulated which was based on a rigorously scientific and objective conception and on rules common to all adherent countries regarding methodical research and investigations, practical organization, official intervention and instruction of the farmers with a view to assuring the protection of cultivated plants. A truly imposing work of peace, progress and international collaboration, to which my country was one of the first to adhere and of which the prime mover has always been this Institute. A fertile work which has borne fruit not only for the good and prosperity of the farmers and the economy of every country, but also for the farmers of the whole world and world economy.

A work which has compelled recognition from the most sceptical because it fills a deeply felt want, and because, from the beginning, it had been clearly conceived, formulated with care and precision and permanently maintained. A vision of fraternity and an ideal of progress are the basis of this convention which has succeeded in re-assembling once again under the aegis of Rome practically all the States of Europe in united work and thought, in a plan of coordinated collaboration.

These are the fundamental principles which have assured the success and perenniality of the Rome international convention for plant protection.

I greatly appreciate, therefore, the honour of being able to speak at the headquarters of this Institute about the mission which I have believed and which I con-

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* Lecture given at the International Institute of Agriculture on June 10, 1943 by its official correspondent, Mr. Traian Săvulescu, Professor at the Faculty of Agronomy, Chief of the Phytopathological Section at the Institute for Agricultural Research of Rumania, Bucharest, Rumania.

tinue to believe in, and to which I have also, with conviction, contributed my share in making it permanent. It is for me an obligation of conscience to present now, after fourteen years have past since I pledged my country to this work of collaboration, that which we have been able to accomplish as regards the program established in common in 1929, and to show at what stage we in Rumania have arrived on the road then started.

(A) Phytopathological organization of Rumania

All rational organization for the protection of cultivated plants should be based on three elements of equal importance. These three pillars which support the rational organization of plant protection are : —

(1) Original scientific activity carried out in laboratories and research institutes. Without this scientific activity appropriate to each country, there can be no practical progress. Evidently, plant pathology, like human pathology and animal pathology, is based on general principles, but the practical application of these principles depends on the knowledge of plant diseases and the means of control for each country, as the biology and ecology of parasites as well as the efficacy of control measures, varies from one country to another, and even from one region to another. Plant pathology, therefore, presents a national and often even a local character.

(2) The intervention of a plant protection service, which is charged with applying in practice the scientific results obtained at experiment stations and laboratories, and to establish a connection between science and the farmer.

(3) Rigorous application of phytosanitary laws, regulations and ordinances n order to prevent, by suitable measures, the transmission of parasites from one country to another, or else their spreading in the interior of the country itself.

At what stage is the phytosanitary organization of Rumania ?

(I) Laboratories and research stations.

Rumania possesses its own organization for the protection of cultivated plants since the creation of the Agricultural Research Institute of Rumania, under the Ministry of Agriculture and Domains. This Institute which has its headquarters at Bucharest, was founded by the Law of May 4, 1927, and began to function in 1929, its object being to solve, by studies based on exact documentation and scientific methods, all problems concerning national agriculture.

The Institute comprises nine central sections: (1) Plant improvement and seed testing ; (2) agrology and phytotechny ; (3) wine-growing and horticulture ; (4) chemistry ; (5) animal husbandry as regards farming ; (6) agricultural machinery and agricultural engineering ; (7) agricultural economics and politics ; (8) flour-milling and panification ; and (9) phytopathology, agricultural entomology and parasitology.

The Agricultural Research Institute of Rumania is an establishment for research work and investigations which functions according to a program fixed by law,

though it also accepts in its laboratories, students from Faculties of Agronomy desirous of specializing in some particular branch of study. Besides these central divisions assembled in an imposing edifice which has aroused the admiration of all who have visited it, the Institute also possesses, in different farming regions of the country, twenty-four well organized local stations, each provided with a sufficient extension of land, all necessary equipment and apparatus, and research laboratories. By the reuniting of the different special branches in the same Institute, from the very beginning, collaboration between experts for the purpose of solving the very complex problems of agricultural science was assured, as also a reciprocal control absolutely necessary for the progress of the research work regarding the agriculture of the country.

The obligations by law of the phytopathological, entomological and parasitological section are :—

(1) Study of all types of plant diseases (virus, bacterial diseases, mycoses, entomophytoses and physiological diseases, as well as their causes) ; (2) investigations on the biology of animal and plant parasites; (3) determination of the means for preventing and controlling plant diseases, and their practical and economic application ; conformably with the law, the Institute effects chemical and biological analyses of fungicides and insecticides manufactured in Rumania or abroad, with a view to their authorization for sale ; (4) the substitution, as far as possible, of preparations manufactured abroad by national products, with a view to utilizing native raw materials and developing a home fungicide industry; (5) testing of machines and apparatus employed in phytotherapy. Finally, the phytopathological division is also required to give advice to the Ministry of Agriculture and Domains and to all institutions attached to same, on problems relating to phytosanitary control and plant protection, and to superintend initiatory action and phytopathological propaganda.

The phytopathological section comprises : the phytopathological section (*sensu stricto*), the entomological station, the phytopathological station for Bessarabia and the phytopathological and control station for Bukovina.

The phytopathological section (*sensu stricto*) and the entomological station comprise : a bacteriological laboratory, a mycological laboratory ; a laboratory for the study of viruses, a laboratory for the study of physiological diseases ; a bio-entomological laboratory ; a laboratory for the examination and analysis of fungicidal and insecticidal products employed in phytotherapy ; a laboratory for testing and trying the apparatus required for the application of treatments in the control of animal and plant parasites. The regional stations of Bessarabia and Bukovina deal principally with practical problems peculiar to the provinces, controlling crops, agricultural products for export and products imported, and are charged with applying in the regions all necessary control measures.

Besides the sections and stations mentioned, Rumania also has the following laboratories and phytopathological centres :—

(1) The laboratory for forest pathology of the Institute for Research and Forest Experimentation ; (2) phytopathological laboratory of the Institute for tobacco cultivation and curing at Bucharest ; (3) nineteen wine-growing information

stations for the control of the downy mildew of the vine (*Plasmopara viticola*) ; (4) a centre for investigations on wart disease of the potato (*Synchytrium endobioticum*), organized this year in the department of Hunedoara. The information stations are in contact with sixty-two auxiliary centres situated in the chief wine-growing regions ; they have at their disposal all the requisite equipment and have given excellent results highly appreciated by the wine-growers.

The results of the investigations and research work undertaken in the laboratories of the Agricultural Research Institute appear in the publications issued by same, namely : (*a*) scientific annals of the Agricultural Research Institute ; (*b*) methods, instructions, reports and enquiries ; (*c*) propaganda publications, pamphlets, leaflets, posters, etc.

The phytopathological section exchanges publications and material with similar laboratories throughout the world. I would like especially to stress the close collaboration between our division and the Italian institutions of phytopathology, and among these, in particular, the Plant Pathology Station at Rome, admirably directed by the eminent Professor L. Petri whose acquaintance I had the honour of making fourteen years ago. It was on this same occasion that I met other excellent Italian phytopathologists as Voglino, Trotter, Silvestri, Trinchieri. The activity of Italian colleagues of whom I take the liberty of citing such names as Petri, Goidànich, Gigante, Biraghi, Baldacci, Pollacci, Savastano, Carbone, Ciferri, Ferraris, is well known in our country, and the results of their research work and investigations are utilized in our own studies. The phytopathological division maintains very close relations with the International Institute of Agriculture, likewise the other divisions of our Institute.

Besides its strictly phytopathological work, the phytopathological section also issues a fungi exsiccata series which up to the present has attained 25 numbers and which is distributed to sixty plant pathology laboratories; five laboratories in Italy receive our exsiccata and in exchange send us material and publications.

Through its director, the phytopathological section officially informs the International Institute of Agriculture regarding all topical phytopathological problems in Rumania. The most important and urgent cases are published in the *International Bulletin of Plant Protection*, which is widely read in our country.

The phytopathological section publishes each year, in Rumanian and in French, a detailed report on the phytosanitary state of crops in Rumania.

The chief problems under study in our division are : downy mildew of the vine (*Plasmopara viticola*), wart disease of the potato (*Synchytrium endobioticum*), cereal rusts (*Puccinia* spp.), bunt (*Tilletia* spp.) and smuts (*Ustilago* spp.) of grain, the systematic and biological study of different groups of phytopathogenic fungi, the problem of the brown rot (*Sclerotinia* spp.) and scab (*Venturia* spp.) of fruit trees, investigations on the San José scale (*Aspidiotus perniciosus*), and, in general, on the scale insects, aphids and Thysanoptera of Rumania, testing the efficacy of different national or foreign fungicidal and insecticidal products.

Much interest is taken in the problems regarding plant immunity to which Italian scientists have brought valuable contributions. The results of studies on this question are published in the annals of the Agricultural Research Institute of

Rumania and in the different foreign reviews among which the *International Bulletin of Plant Protection* stands to the fore. Considerable progress has been made in the study of grain rusts, bunt and smuts, both from the standpoint of biology and from that of specialization of the parasites and the resistance of the different varieties and pure selected strains. The study of the wart disease of the potato is directed towards the discovery of creation of new resistant varieties. In collaboration with the plant improvement division, it has been possibile to obtain results of considerable importance, by determining exactly the resistance of each strain and establishing distribution charts for the most important crops.

In studying fungicides and insecticides, we have endeavoured to find rapid and sure chemical and biological methods of analysis. We have examined the different raw materials of our country, especially the derivatives of petroleum with a view to their utilization in phytotherapy. In collaboration with the fungicide and insecticide industries of our country and abroad, we have tried to obtain modifications in the formulae and chemical compositions of these products in order that they may better correspond to the conditions of soil, climate and virulence of the parasites of our country. The list of fungicides and insecticides which are authorized for use in Rumania has been published in the *International Bulletin of Plant Protection.*

(II) Official plant protection service of the Ministry of Agriculture and Domains.

The Plant Protection Service of the Ministry of Agriculture and Domains was organized as such on April 1, 1933, but was known formerly as the Entomological Office under the department of plant cultivation of the same Ministry. The technical supervision of this service is incumbent, in conformity with the law, on the phytopathological section of the Agricultural Research Institute of Rumania, with which it is in close collaboration.

The establishment of this service was imposed by : the necessity of having an official central organization contributing by means of suitable technical and administrative measures to qualitative and quantitative improvement in production ; the exigencies of our trade in plants and parts of plants, the import and export of which is only rendered possible by guaranteeing the soundness of the products by phytopathological certificates issued by an officially recognized institution or person ; the obligation that the State has assumed in adhering to the international convention requires that all the associated countries should take the necessary measures to assure common and effective action against the introduction and spread of the diseases and pests of cultivated plants.

The mission of the plant protection service is to supervise crops and nurseries of all kinds so as to be always aware of the presence and spread of plant diseases and parasites, to propagate information on the diseases and pests of plants, and to apply the necessary measures for preventing and controlling these parasites. It supervises the trade in plants and parts of plants inside the country, for export, import and transit. It issues phytopathological certificates which testify to the origin and authanticity of the plants and their soundness.

In consequence of the phytosanitary measures applied by the plant protection service, the good conditioning of agricultural products for export has been greatly facilitated and there has been no difficulty in continuing exports.

The plant protection service has, above all, the obligation of assuring permanently the technical character of our phytosanitary organization. To this end although coming directly under the supervision of the Ministry of Agriculture and Domains, it works in the closest collaboration with the phytopathological section of the Agricultural Research Institute of Rumania, which directs it in its activity.

In executing phytosanitary control, the plant protection service collaborates with the departmental agricultural organs, the Chambers of Agriculture and the local administrative services. Among the campaigns undertaken in the course of ten years' activity of the plant protection service, we will mention the most important. First, the campaign against locusts (*Locusta migratoria*) which, in 1927, issued forth from ther principal endemic focus of the Danube Delta, and, up to 1933, had progressively invaded ever larger areas, infesting 3,640,000 ha. of cultivable land particularly in the east of the country, in South Bessarabia and Dobrudja.

Utilizing the most up to date control methods, with the assistance of administrative and military organizations, and without any expense being spared by the State, the plant protection service managed, in only one year, to arrest the spread of the pest and, to destroy the locusts which had attacked the crops, to such an extent that in 1935 they were driven back to isolated foci in the Danube Delta where they could no longer cause damage. In the uninterrupted campaign which the State carries out to combat this pest, it is conscious of the mission it has to protect Europe from invasions which may come from the East where, besides the locusts, there is also the sugar-beet webworm (*Phlyctaenodes sticticalis*) which sometimes is very injurious. The plant protection service has installed in the Danube Delta a permanent station for the observation and study of locusts for the purpose of following their evolution and raising the alarm as soon as they might manifest any tendency to leave the delta, so that the necessary measures might be taken immediately.

Another important campaign undertaken by the plant protection service, with the co-operation of the forest services and local administrative organizations, was that of the destruction of the barberry (*Berberis vulgaris*), intermediate host of the black rust of cereals (*Puccinia graminis*) which has caused losses estimated at 60-80 per cent. of the wheat crop, in the course of the years 1932 and 1933. Hundreds of thousands of shrubs, especially those growing in the vicinity of grain fields, have been methodically destroyed.

The plant protection service has also organized an extensive campaign for the control of wheat bunt (*Tilletia* spp.). The losses brought about by bunt, a few years ago, would be as much as 30 per cent. of the wheat crop. This was a very high figure. In following its policy of protecting agriculture, which is the principal occupation of our people as well as the main source of national income, the State recognized the necessary importance of the phytopathological factor and spared no pains, despite the difficulties of the war, to diminish the damage caused by bunt and to improve wheat production both qualitatively and quantitatively. While, up to 1939, only 10 car-loads of fungicides in powder were employed for the control of

bunt, and only 10 per cent. of the autumn wheat seed was treated, in 1940, the State purchased and distributed through the National Cooperative Institute, 25 car-loads of fungicides; in 1941, 60 carloads were distributed and, in 1942, 70 car-loads. The maximum quantity of fungicidal products for bunt control, which we would require is 120 car-loads. The Ministry of Agriculture and Domains, through its regional technical organizations and with the assistance of the Chambers of Agriculture, has distributed abundant quantities of these products for the control of bunt and has obliged the farmers to treat their wheat according to the instructions given, penalizing severely all recalcitrants. In this way, it has been possible to treat 60 per cent. of the quantity of wheat employed for seed and the result has been increase in production both as regards quality and quantity. For the autumn of 1943, provision has been made for 100 car-loads of fungicides in powder to the amount of 308,000,000 lei. The expenditure of the State has not only been recuperated but also exceeded four or five times through the increase in revenue. The preparations used are organo-mercuric products which, under the climatic conditions of our country, are the most effective next to the liquid treatments which always remain the best.

The plant protection service has installed in some agricultural centres stations for the control of loose smut of wheat (*Ustilago nuda tritici*) and of barley (*U. nuda*), using the hot water treatment. To protect wine-growers from the severe losses which they sometimes suffer, information stations have been organized which operate according to the instructions and scientific methods laid down by the phytopathological division of the Agricultural Research Institute of Rumania, and which are in relation with sixty-two auxiliary stations distributed over the different wine-growing regions of the country. Each station possesses a suitable meteorological installation and laboratory equipment necessary for the observation and study of the development of downy mildew of the vine. In 1943, five other information stations will be established and put into operation, in this way providing the wine-growing regions with the necessary stations which have given excellent results. When invasion of the downy mildew is very violent (as in 1940 and 1941), the stations notify the wine-growers when to apply treatments in order to obtain the maximum effectiveness. When the weather is unfavourable for this fungus, the indications given by these stations enable the wine-growers to economize in copper sulphate ; this was the case in 1942 when the crop was saved by applying only three treatments of Bordeaux mixture and employing only half of the usual dose. In place of the 700 car-loads of copper sulphate, only 400 car-loads were consumed. This year, it is hoped to be able preserve the vineyards from downy mildew attack, always with the cooperation of these stations, and with maximum economy in copper sulphate.

In view of the fact that the greater part of diseases spread from nurseries, horticultural establishments or farms belonging to the State or privately owned, these have been submitted to rigorous and permanent control and inspection in order to prevent the transport and diffusion of parasites throughout the rest of the country. During 1942, 543 nurseries and horticultural establishments, of which only 183 received permits, were inspected ; the other 360 nurseries, which were not found

satisfactory from the phytosanitary standpoint, were not licenced to sell material for propagation. I venture to affirm that, thanks to the rigorous supervision of nurseries and also of the sales markets for these products, we have checked, in so far as is humanly possible, the tendency of the spread of noxious parasites. In 1938, 1362 nurseries were inspected and out of these only 904 were given licences. At present all nurseries are under supervision, and those which do not meet phytosanitary requirements, are forced to close down. On the insistance of the plant protection service, in the large nurseries for propagation material have been installed depots for the disinfection of horticultural products by the fumigation of hydrocyanic acid gas and the ethylene oxide treatment.

To date there are 18 such depots in operation. Moreover, the proprietors of small nurseries are required to construct basins for disinfection with liquid preparations, in order that the material intended for planting may be disinfected before leaving the nursery. Likewise we have succeeded in suppressing clandestine nurseries and illicit trade in non-inspected horticultural products. In 1941-42, 12,022 young trees were destroyed which were infested with the San José scale (*Aspidiotus perniciosus*) which penetrated into our country in 1933 coming from Hungary.

A very extensive campaign for the destruction of the Moroccan locust (*Dociostaurus maroccanus*) and the Italian locust (*Calliptamus italicus*) as well as the larvae of *Anoxia* and *Melolontha*, has also been undertaken. In this campaign, besides the support given by the administrative authorities, there has also been the valuable co-operation of the schools. Control operations continued each year against rodents, a veritable scourge of crops in the steppe region, are also very important.

During this time, the plant protection service has closely followed, through the organizations of the frontier and the centre, the problem of the control of agricultural products for import, export, and transit. In the course of the year 1941-42, for example, the following quantities of agricultural products were controlled :—

Importation

43,000 kg. vegetable and flower seed
40 kg. living plants, bulbs, cuttings
2,935,493 kg. exotic fruits
326,901 kg. crop seed
859,226 kg. seed of industrial plants
157,566 kg. forage plant seed
638 kg. medicinal plant seed.

Exportation

244,241 kg. bulbs
50,000 kg. seed of all kinds.

Transit

200,320 kg. fruit
600,000 kg. seed of all kinds.

In pursuance of the law for the organization and protection of agriculture, trade in fungicides and insecticides can only exercized in Rumania by virtue of thechemical

and biological analysis effected at the phytopathological section of the Agricultural Research Institute. If the products correspond from the chemical standpoint and if they are effective from the biological standpoint, manufacturers or their representatives are given authorization to place them on sale. Up to the present, the plant protection service has issued sales permits for insecticides and fungicides manufactured in this country or abroad. The list of these products has been published in the *International Bulletin of Plant Protection*. By effecting rigorous control of the preparations employed in phytotherapy, we have succeeded in eliminationg from the market ineffective or not very sure products and we have protected Rumanian farmers from the frauds which some manufacturers, deprived of any scruples, practised on them.

We may assert that, thanks to the measures taken, we have resolved this problem. In order to ascertain exactly the phytosanitary state of crops, they are inspected each year during the different seasons. The phytopathological division also publishes each year, in Rumanian and in French, a report on the phytosanitary state of Rumania. From the data collected in the course of the inspections, an accurate chart is drawn up of the distribution of the San José scale ((*Aspidiotus perniciosus*), also a chart indicating the appearance of the Hessian fly (*Mayetiola destructor*) for the exact determination of the period for autumn wheat in relation to the period of appearance of this insect in the different regions of the country. Maps have also been made of the distribution of other animal and plant parasites and of berberry Conformably with the principles and stipulations of the Rome international convention for plant protection, the plant protection service, taking as a basis the data supplied by the phytopathological division, has drawn up a list of the animal and plant parasites considered dangerous, taking at the same time protective measures at the frontiers and inside the country. In consequence of the phytosanitary control of plantings of fruit trees and the inspection of fruits at the frontier, our fruit trade has been facilitated and the phytopathological certificates issued by us have never been disputed.

May I add two further examples of the way in which Rumania has solved its problems of national economy by paying the necessary attention to the phytopathological factor so prohibitive for agricultural production and its improvement. As is known, Rumania is an exporter of clover and lucerne seed. Rumanian clover is known and valued under the name of Transylvanian clover, although it is cultivated not only in this province but also in Bukovina and in northern Bessarabia. To ensure the uninterrupted exportation of clover and alfalfa seed and, at the same time, to save the farmers losses caused through dodder invasion, the State, by virtue of the law for the organization and protection of agriculture. has instituted severe control of clover and alfalfa crops throughout the principal seed-producing regions. At the same time, it has given every assistance in the establishment of depots for ' de-doddering ' At present there are 32 of these depots situated in 18 centres. Among these, 25 possess modern electro-magnetic equipment. 13 of which are the property of the State or of Chambers of Agriculture. These depots and also all trade in clover and lucern are under the control of the Agricultural Research Institute which also issues certificates and analysis reports. To be able

to deposit, put into good condition, standardize and improve agricultural products, the State has caused to be constructed and put into operation silos situated in the chief farming regions and railway centres. These silos are provided with equipment for disinfection with gas, for which chiefly the German product ' Cartox ' is employed.

The plant protection service has undertaken extensive propaganda action for the initiation of farmers and horticulturists, for the training of assistant specialists and for the instruction of the public by means of courses, periodical publications, lectures, practical demonstrations, exhibitions, pamphlets, posters, etc.

The plant protection service has organized itself or through the intermediary of the Chambers of Agricuture, squads of workers for combatting the parasites of fruit trees. These squads, equipped with the necessary apparatus and material' have carried out effective propaganda work, the results of which have immediately been noted. Recently, the application of treatments in fruit-growing has made great strides, and the quantity of fungicides and insecticides employed has increased three times. I should add that the State requires fruit-growers to destroy caterpillars and to apply at least the winter treatment. In consequence of these measures, scale insects (*Lecanium corni, Physokermes coryli*) attack has been checked ; scab (*Venturia* spp.) and brown rot (*Sclerotinia* spp.) have diminished. The propaganda action of the plant protection service is supported by the newspapers which have shown their understanding by placing at the disposition of the service, columns and even entire pages for the dissemination and popularization of agricultural information. The education of the farmers as regards phytosanitary regulations is not effected at random. It is directed and supervised by the phytopathological section and is developed within the wide compass of the international convention of Rome. This is why we have asserted from the beginning that the date of the stipulation of this convention marks an epoch in the history of plant pathology. It was at this moment that the true cadre of the phytosanitary problem was determined, that its true aims were exactly defined and that effective means of intervention were precisely established in order that the campaign conducted jointly againts the enemies of cultivated plants might be crowned with success.

The plant protection service of Rumania is composed of three divisions : the first functions under the Department of Plant Production, the second under the Department of Wine-growing and Horticulture, and the third under the Forestry Department of the Ministry of Agriculture and Domains. Each of these three divisions with the requisite technical personnel deals with the respective phytosanitary problems. In order to be able to operate rapidly and with efficacy, the territory of the country has been divided into 12 phytosanitary regions, supervised by phytosanitary inspectors, specialized agricultural engineers.

The phytosanitary regions comprise 2 or 3 departments. These are charged with local phytosanitary inspection, the practical application of phytosanitary ordinances, as well as propaganda and the initiation of the population. The inspectors of the peripheral regions also execute phytosanitary control at the customs for products intended for export, import and transit.

Besides its own phytosanitary organization of which we have just spoken and which functions according to the scientific methods of this particular branch, the

plant protection service employs as auxiliary working organs, the departmental agricultural services, the Chambers of Agriculture, agricultural and horticultural schools of all types, State farms and nurseries. In the campaign undertaken by the State to assure progress in agriculture by appreciating at its true value the phytopathological factor, the co-operation of priests and village school masters is of inestimable worth. For their initiation, courses have been organized which teach them the fundamental elements of all the practical problems regarding the regions and localities where they exert their activities.

(B) Laws, regulations, ordinances, decrees

(I) Control and phytosanitary regulation inside the country.

To assure control and phytosanitary regulation inside the country, the State has enacted the following laws, regulations, ordinances and decrees: —

(*a*) Penal code. By virtue of Article 378 of this code, all persons who oppose or attempt to shirk the measures taken by the authorities for preventing or localizing infectious plant diseases, are considered as offenders and punished with 1 to 3 months imprisonment and a fine of 2000 to 5000 lei. Recidivists are condemned to a term of imprisonment of 3 to 6 months and to fines of 2000 to 7000 lei.

(*b*) Law for the organization and protection of agriculture, dated March 19 1937 and its regulation of October 12, 1937. By virtue of this Law and its regulation, for the first time in Rumania, a regime of crop protection was instituted with the object of improving qualitatively and increasing quantitatively agricultural production. In the VIth part of this basic law of Rumanian agriculture are stipulated all the rules of control and phytosanitary regulation. To ensure phytosanitary regulation inside the country, all those who produce, hold or offer for sale, under any qualification whatsoever, seed, fruit, plants and parts of plants, are subject to supervision of the Ministry of Agriculture and Domains, which has the right to execute, through the intermediary of its authorized delegates, inspection of crops, sales stores, storehouses, stations and ports where these products are loaded and discharged, in order to examine their condition (Article 65). The products considered as infected or as carriers of diseases, insects or other dangerous parasites may only be sold or transported after disinfection by the proprietor (Article 66). In the case of one of the diseases, parasites or insects considered as dangerous being found, the Ministry of Agriculture and Domains takes measures for the destruction or disinfection of the products which cannot be removed from the nursery, premises or infested depot until the centre of infection has been completely suppressed. When a disease or parasite has invaded one or more communes, the Ministry of Agriculture and Domains declares these communes contaminated, takes the necessary measures for disinfection and destruction and regulates the transport of plants, parts of plants, seeds and fruit (Article 68).

Conformably with Article 72 of the Law, the Ministry of Agriculture and Domains may exact the application of treatments necessary for controlling plant

diseases, parasites or noxious insects, or execute on behalf of the State, communes, or in association with the communes, the control measures necessitated by circumstances. In the case of disaster, the local administrative organizations are required to contribute funds and the necessary material and labour (Article 73). The provisions of Articles 15, 18, 177 and 180 (8th point of the law for the organization and protection of agriculture) refer particularly to the control of the dodder of clover and lucern fields. The provisions contained in these articles are amplified by the regulation of the Law promulgated on October 12, 1937 especially insofar as regards dodder control, and by the Ministerial Decree No. 134.343 dated July 9, 1937. All cultivators are obliged to destroy dodder according to the detailed techincal instructions stipulated by this Decree.

The IVth chapter of the law for the organization and protection of agriculture indicates the rules according to which fungicides and insecticides may be employed in Rumania. In conformity with the provisions of Article 78, only those products authorized by the Ministry of Agriculture and Domains, by virtue of chemical and biological analyses carried out at the laboratories of the phytopathological section of the Agricultural Research Institute, can be introduced into the country and can be employed for the control of plant pests. In making application for a sales permit, the manufacturers of fungicides and insecticides are required to annex and to deposit at the Agricultural Research Institute, the formula of the products in question. Advertisements containing inaccuracies or directions differing from those given by the Agricultural Research Institute are prohibited (Article 79 of the law and regulation). Trade in fungicides and insecticides is subjected to permanent supervision (Article 80). With this object, the officials of the Ministry of Agriculture and Domains, specially authorized, have the right to inspect pharmacies, drug-shops, stores and depots containing products intended for use in the control of plant pests, and to take samples for analysis by the phytopathological division. Unlicenced products or those which do not correspond to the licence by virtue of which they were put on sale, are confiscated and their proprietors, considered guilty of fraud, are liable for punishment. As a result of the continuous supervision to which fungicides and insecticides have been submitted, inferior quality specialities have disappeared from the market, and it has been possible to develop really efficacious products according to their capacity. The phytopathological division of the Agricultural Research Institute who directs this work realized that this simple supervision is not sufficient, and that it had to come to the assistance of the farmers as well as the industries and conscientious manufacturers, with advice and instructions. A large number of manufacturers have profited by this assistance and have adapted their preparations to the conditions of the soil, climate and ecology of the parasites of our country. To aid agriculture and farmers, other measures, specified in different ordinances and decrees, have also been taken. Among these are :

(*c*) Ministerial Decrees Nos 217.826 and 317.973 of October 18, 1932 for the destruction of berberry (*Berberis vulgaris*) in Rumania. Control operations begun in 1932 and conducted with the co-operation of forestry organizations, schools, the army, administration and the constabulary, gave very good results.

(*d*) Ministerial Decree No. 161.844 of July 25, 1933, dividing Rumania into 25 phytosanitary regions, which number was reduced to 12 following the territorial changes which took place in the country. By this Decree, phytosanitary inspectors were engaged and inspection rules established.

(*e*) A Ministerial Decree establishing the rules according to which arsenical products should be employed to avoid poisoning of persons and prohibiting their use in wine-growing.

(*f*) Ministerial Decrees No. 217.221 of 1937, No. 171.408 dated July 15, 1939, and No. 2.160 of September 4, 1939 specify the persons commissioned with carrying out inspection of fungicides and insecticides, as also the rules according to which said inspection should be made.

(*g*) Ministerial Decree No. 273.032, dated September 26, 1937, institutes a permanent commission charged with the control of the San José scale (*Aspidiotus perniciosus*).

(*h*) Laws Nos. 699 of July 30, 1941 and 313 of April 22, 1942, the Ministerial Decrees Nos, 175.558 of July 21, 1939, 31.557 of October 3, 1941 and 2.261 of February 6, 1942 by which the plant protection service is divided into three divisions which function under the Department of Plant Production, Department of Wine-growing and Horticulture, and the Forestry Department.

(*i*) Resolution No. 295.398 dated December 21, 1937 by which nurserymen are required to install fumigation rooms for the use of hydrocyanic acid gas.

(*j*) Ministerial Decree No. 8.218 of May 2, 1940 relative to the modification of the doses of fungicides to be used against bunt and smuts of cereals, in order to adapt them to the conditions of the country.

(*k*) Finally the Law for the organization of the Ministry of Agriculture of 1939, designating in an even more specific manner the organizations charged with phytosanitary regulation.

The application of these laws and decrees, as well as the ever increasing advanced specialization of the technical staff for phytopathological and phytosanitary problems, has resulted in the creation, in our country, of a tradition and phytopathological climate propitious for the advancement of agriculture.

(II) Phytosanitary regulation and control of plants and parts of plants for import, export, and transit.

This control is based on the following laws, regulations, decrees and ordinances:

(*a*) The international phylloxera convention, signed at Bern on November 3, 1881 (Article 19). In conformity with the provisions of the law for the control of phylloxera, Rumania adhered to this convention. The stipulations of this convention were also applied to trade in fruit trees.

(*b*) The international convention for plant protection, signed at Rome on April 16, 1929. Together with 23 other States, Rumania adhered to this convention which was ratified by vote of Senate on February 24, 1932 and by vote of the Chamber of Deputies on March 19, 1932. Ratification was notified by the Ministry of Foreign Affairs to the Italian Government and to the International Institute of

Agriculture. In accordance with the provisions of this convention, Rumania possesses an official phytopathological organization and can fulfil both home requirements (conditioning of agricultural products from the phytosanitary standpoint and delivery of phytopathological certificates). The solution of special problems regarding the phytosanitary conditioning of plants and parts of plants intended for import, export and transit, the issuing of phytopathological decrees and ordinances, and the publication of lists of plant pests against which the State desires to take protective measures, devolve exclusively upon the phytopathological division of the Agricultural Research Institute of Rumania, and are evolved within the framework of the Rome convention. The certificates which accompany the consignments of plants or parts of plants for export correspond to the form attached to the said convention. These certificates may be granted by the phytopathological section of the Agricultural Research Institute and by the plant protection service. They carry the seal of these organizations and are signed only by persons of whose signature an exact copy has previously been sent to all States with which Rumania maintains trade in agricultural products.

(*c*) The Law relative to the organization and protection of agriculture of March 19, 1937 as well as the regulation of this law on October 12, 1937. In this law and regulation are stipulated the rules of phytosanitary organization for importation, exportation and transit. Actually, conformably with the provisions of Article 74 of the Law and Article 74 of the regulation only the plants, parts of plants, seed and fruits accompanied by a phytopathological certificate which guarantees their condition and which confirms that these products do not contain parasites injurious to the agriculture, forestry and horticulture of the country, are authorized for importation and transit. These certificates should be delivered by an official institution authorized by the exporting country and recognized as such by the Ministry of Agriculture and Domains of Rumania. The importation and transit of plants and parts of plants from abroad is allowed only through certain frontier stations, a list of which has been published in the *Monitorul Oficial*, and where thorough examination is carried out. The list of these frontier stations has been sent to all the exporting countries with which Rumania maintains commercial relations. In accordance with the provisions of Article 75 of the Law, the Ministry of Agriculture and Domains may cause to be inspected by its authorized officials, all transport of plants, parts of plants, seed and fruits intended either for importation or for transit, as soon as they arrive at a frontier station whether accompanied or not by a phytopathological certificate. If it is found that the products in question are infected, the Ministry is entitled to refuse entry into the country or to take measures for the disinfection or destruction of same, at the custom-house or at any other place whatsoever in the country. The State is not obliged to make any compensation for the losses caused, which devolve on the proprietor of the goods. The Ministry of Agriculture and Domains has the right to put under quarantine or to prohibit temporarily the importation or transit of plants, parts of plants, seed and fruits, even if consignments are accompanied by certificates of condition and origin. The exporting country has to be informed of

this decision (Article 76). Each year the Ministry publishes a list of the diseases, insects and animal and plant parasites considered dangerous and sends a copy of same to the International Institute of Agriculture. Besides the above-mentioned international conventions and the Law for the organization and protection of agriculture, the control and phytosanitary regulation of exportation, importation and transit, there are also a series of decrees and ordinances which we cite herewith :

(*d*) The Ministerial Decree No. 57.626 of March 13, 1932 regards the importation of potatoes. To prevent the introduction into Rumania of parasites injurious to potato crops such as the Colorado beetle (*Leptinotarsa decemlineata*), the potato tuber moth (*Phthorimaea operculella*) and wart disease (*Synchytrium endobioticum*), only tubers provided with a phytopathological certificate delivered by a competent official agent, expressly authorized by the exporting country, may be imported. The officers authorized by the Ministry of Agriculture and Domains have the right to effect inspection of all consignments of potatoes from abroad even if provided with a sanitary certificate. Consignments devoid of certificates and those which on inspection are found to be infested, will be rejected or destroyed at the expense of their legitimate owner. The transit of potatoes over Rumanian territory is only authorized in closed and sealed through-freight-cars, accompanied by sanitary certificates.

(*e*) Ministerial Decree No. 161.850 of July 26, 1933 specifies the institutions and persons entitled to grant phytopathological certificates.

(*f*) Ministerial Decree No. 154.238 of June 7, 1934 regards the importation of haricot beans. In order to prevent the introduction of the bean bruchid (*Acanthoscelides obsoletus*), all consignments of beans for importation will be rejected if not provided with a valid phytopathological certificate. The other regulations are similar to those contained in the Decree relative to the importation of potatoes.

(*g*) Ministerial Decrees Nos. 220.659 of November 3, 1934, 97.629 of May 24, 1936 and 108.209 of May 24, 1935 regulate the importation of plants which might introduce into our country the San José scale (*Aspidiotus perniciosus*). These Decrees specify the conditions governing importation and also the period for which the phytopathological certificates are valid, etc.

(*h*) The Ministerial Decrees Nos. 220.852 of October 23, 1936, 12.228 of January 23, 1937, 258.840 of November 12, 1937 and 784 of August 12, 1939 regard the importation of plants and parts of plants (bulbs, rhizomes, roots) from countries with Colorado beetle (*Leptinotarsa decemlineata*) infestation. Consignments must be accompanied by valid phytopathological certificates which confirm that they are free from eggs, larvae and nymphs of the Colorado beetle, that they contain no earth, and that the place of origin of the products is at a distance of at least 50 km. from the nearest locality infested by this insect. Close attention is paid to azalea imports from contaminated countries.

(*i*) Ministerial Decree No. 300.126 dated November 17, 1938, regulates the transport through Rumania of trees of all kinds, shrubs, cuttings, vineplants and

all plants with roots, as well as potatoes, beans, green peas, lentils and seed of forage plants.

(*j*) Ministerial Decree No. 2456 dated January 9, 1939, regards the establishment of a permanent committee which has to take the necessary measures to prevent the penetration of the Colorado beetle (*Leptinotarsa decemlineata*) into the country.

(*k*) Ministerial Decree No. 93.534 of May 5, 1936 prohibits, for a period of 5 years, all importation of seed and cuttings of *Pinus strobus*, *P. lambertiana*, *P. flexilis*, *P. monticola*, *P. cembra* var. *sibirica* in order to prevent the spread of the blister rust of the five-needled pines (*Cronartium ribicola*). The cultivation of the above-mentioned species in Rumanian nurseries is prohibited, also for 5 years.

(*l*) Ministerial Decree No. 5195 of March 19, 1942 indicates the persons authorized to sign phytopathological certificates ; this Decree also gives facsimiles of the signatures and seals of the institutions to which said persons pertain.

(*m*) Journal No. 785 of April 16, 1938 contains the list of animal and vegetal parasites injurious to plants.

Conclusions

Rumania possesses a State phytopathological organization made up of the following institutions : —

(1) Scientific research stations, to wit : —

(*a*) the section of phytopathology, agricultural entomology and parasitology of the Agricultural Research Institute ;

(*b*) the laboratory of forestry pathology attached to the Sylvicultural Research Institute ;

(*c*) the phytopathological laboratory of the Institute for the cultivation and curing of tobacco at Bucharest ;

(*d*) the centre for the study of wart disease of the potato (*Synchytrium endobioticum*), established in 1943 at Câmpul lui Neag in the department of Hunedoara ;

(*e*) 19 information stations for downy mildew of the vine (*Plasmopara viticola*), assisted by 62 auxiliary stations situated in the chief wine-growing regions ;

(*f*) the observation centre for locusts in the Danube Delta ;

(*g*) the regional stations of Chişinău and Cernăuţi :

In addition, there is attached to each of the Faculties of Agronomy of Bucharest, Timişoara and Jassy a laboratory for investigations and documentation regarding phytopathological problems.

Without false modesty, I may say that the scientific activity carried out in Rumania since 1918, in the sphere of plant pathology, is well known and esteemed by the competent authorities of the different countries. This fact is confirmed by the wide circulation of our publications and the participation of Rumanian specialists in the international scientific phytopathological movement.

(2) The official plant protection service. This Service comprises three divisions : one attached to the Department of Plant Production ; the second to the Department of Wine-growing and Horticulture and the third to the Forestry Department, of the Ministry of Agriculture and Domains. We have shown in detail the organization of this Service and in what way it has acted in rendering immeasurable benefits to Rumanian agriculture. This Service has undertaken numerous field campaigns, extensively supported by the State ; it has exercized continuous inspection of nurseries and establishments producing material intended for propagation, as well as agricultural products for importation, exportation and transit.

Without the methodical and punctual intervention of this service, our export trade in agricultural products would have been seriously checked, if not stopped. This Service has also undertaken a vast campaign of instruction and propaganda by which it has succeeded in rousing the interest of the farmers in plant protection problems. For the accomplishment of its mission, this Service received the assistance of phytosanitary inspectors, Chambers of Agriculture, departmental agricultural schools and, whenever necessary, of the administrative and military authorities.

(3) Rumania adhered to the international phylloxera convention of Bern and to the Rome international convention for plant protection, by virtue of which it has organized its regime of plant protection.

Rumania possesses, besides the basic law for the organization and protection of agriculture (1937), which contains the principles of organization of plant protection under its different technical, administrative and juridical aspects, numerous regulations, ministerial decrees and ordinances relative to control and phytosanitary regulation.

In consequence of the scientific activity of the research institutions and the efforts of the technical organizations charged with the application of plant protection measures, generously supported by the State which has spared no sacrifice, Rumania possesses one of the most solid phytopathological organizations of Europe, capable of giving sound assistance to agricultural production. The Rumanian sanitary certificates have always represented a guarantee of good condition of the products which they accompanied beyond the frontiers, thus facilitating the trade relations of our country.

We have arrived at these results chiefly because we have complied with the stipulations of the international convention for plant protection of Rome.

To conclude, may I be permitted to express my deep conviction that among the many possibilities of collaboration between my country and the Institute, that which regards crop protection, is both from the scientific and from the practical standpoint, the one surest of success. There are numerous problems which could be the object of close collaboration. I mention in the first place the problem of the control of cereal rusts and, in particular, rusts of wheat. As has been shown at many international congresses, the problem of the effective control of rusts can only be solved by a methodical organization, founded on unitary principles, within an international cadre.

The Rome Institute which has taken the initiative and which has solved so many problems of vital importance for world agriculture, is the only one in a position to organize this beneficial work for agriculture.

The building up of a general phytopathological atlas with maps showing the geographical distribution of the most dangerous parasites so as to be able to ascertain at any moment the position and tendency of expansion, would, in my opinion, also be a work of especial scientific and practical importance, entirely in agreement with the aims and available means of the International Institute of Agriculture. This atlas, prepared with the collaboration of experts of all countries, has its place only in the Rome Institute, which will have to dispose of sufficient means for centralizing, coordinating and interpreting the data received.

Another work of collaboration, the consequences of which would be immediately felt in the economy of every country, is the study, according to unitary methods, of the possibilities for the creation of a phytopharmacy emancipated from the empiricism which has governed it until now.

Prof. Ugo Papi, *Segretario generale dell'Istituto, Direttore responsabile.*

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